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**THE DECENNIAL OF AIR FORCE SPACE COMMAND'S ONLY  
GROUND BASED MISSILE WARNING CLASSIC ASSOCIATE  
UNIT: BENEFITS, DRAWBACKS, AND CHALLENGES**

by

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## **PREFACE**

Air Force Space Command, the State of Alaska, and the National Guard Bureau integrated Air National Guardsmen with Active Duty Air Force Ground Based Missile Warning and Space Surveillance operators to create the only Classic Associate unit in the Ground Based Missile Warning architecture. The idea for this paper came from my interest in the Total Force Integration structure at this unit. Research on Total Force Integrated (TFI) units found many academic papers on Aircraft flying missions, but few on TFI space units, and none on this Ground Based Missile Warning and Space Surveillance unit at Clear AFS, Alaska.

I would like to thank my instructor and advisor, Dr. Gregory F. Intoccia who has been a terrific sounding board and guide as my research shifted directions midway through the course. Without his sound judgment and advice, this paper would not have materialized. I would also like to thank my stepfather, who has been my mentor and role model throughout my entire academic career.

Finally, I offer my most indebted thanks to my family. My wife has been a great supporter and editor throughout this program. She has taken care of every aspect of our life outside of work and school. She nursed me back to health after two surgeries last year, watched over our son and dog, and kept the woodpile full these last two winters. In addition, to my son, thank you for being patient while I sat in the same spot on the couch doing homework for the last two years.

## **ABSTRACT**

On 14 April 2016, Clear Air Force Station (AFS) will celebrate a decade of operating its Ground Based Missile Warning (GBMW) radar under an Air Force and Air National Guard Classic Associate unit construct. The purpose of this paper is to examine what have been the benefits, drawbacks and challenges of this Total Force structure. This paper employs a case study methodology to explore the history of the unit, explain the GBMW mission, and identify how this construct could benefit the transition to a Space Mission Force concept for operating in the new Contested, Degraded, and Operationally Limited space environment.

Amongst key findings were the benefits Guardsmen bring in continuity and experience level. Drawbacks were Military Personnel Appropriation day usage, delays in Guardsmen certification training, Guard officer career stagnation, and challenges of having two commanders. Based on the findings, this paper offers four key recommendations: make all Continental United States (CONUS) GBMW sites Classic Associate units, make Missile Warning a Homeland Defense mission, create an Air National Guard GBMW career path, and assign one Dual Status Commander. A Classic Associate unit construct employed at all CONUS GBMW sites would provide the Combatant Commander with an adept, experienced GBMW crew force.

## INTRODUCTION

Air Force Space Command (AFSPC) operates a wide spectrum of missions to provide Combatant Commanders space assets and capabilities; one of these missions is Ground Based Missile Warning (GBMW) and Space Surveillance.<sup>1</sup> Though AFSPC space operates two numbered Air Forces and five Space Wings, with 13,000 Active Duty Air Force and 7,200 Air National Guard members, there is only one Total Force Integrated (TFI) Air Force and Air National Guard Classic Associate GBMW unit.<sup>2</sup>

In 2001, a Total Force Initiative began to integrate Alaska Air National Guardsmen into the GBMW mission operated by AFSPC's 13<sup>th</sup> Space Warning Squadron (SWS) at Clear Air Force Station (AFS) Alaska. By 2006, the Alaska Air National Guard created the federally recognized 213<sup>th</sup> SWS, making the 13<sup>th</sup> and 213<sup>th</sup> a unique TFI space unit. Since the start of this integrated operation, the 13<sup>th</sup> and 213<sup>th</sup> SWS has become the most experienced GBMW space operations force in the entire GBMW network.

On 14 April 2006, the 13<sup>th</sup> and 213<sup>th</sup> SWS will celebrate a decade of blended, TFI operations. As many benefits as the Total Force structure provides in experience and continuity of operations, it has drawbacks and challenges. This research paper explores the question, what have been the benefits, drawbacks, and challenges of Air Force Space Command's only Classic Associate Ground Based Missile Warning unit, the 13<sup>th</sup> and 213<sup>th</sup> Space Warning Squadron at Clear AFS, Alaska? Could other Air Force Space Command GBMW units benefit from this Total Force paradigm?

The Air Force and Air National Guard Classic Associate unit construct in use at Clear AFS could provide the Missile Warning and Space Surveillance mission set with deftly, experienced GBMW operators. Guardsmen, such as those at Clear AFS, often spend decades on

one weapons system, making them expert operators, trainers, evaluators, and tacticians in their respective mission. By obtainable restructuring and changes to address drawbacks and challenges of this Classic Associate unit structure, broadly utilizing this Total Force construct at all Continental United States (CONUS) GBMW sites could provide a more seasoned and experienced space force ready to meet the Combatant Commanders needs.

The Classic Associate unit construct at Clear AFS provides a Guard space crew force with an average of five years of experience in the Missile Warning and Space Surveillance mission set; more than any other GBMW unit. This construct creates an effective and efficient operational environment where Active Duty members benefit from training and working alongside seasoned Air National Guard (ANG) members, many of whom have experienced many of the non-routine events that happen in space. Pairing experienced ANG members with new Active Duty GBMW operators is so effective that many Active Duty members rapidly obtain instructor or evaluator certifications. AFSPC can then capitalize on the experience gained by these Active Duty members and move them to positions in the 21<sup>st</sup> Space Wing (SW) training or evaluation sections, or by sending them to other GBMW sites. While AFSPC transitions to the new Space Mission Force (SMF) construct to operate in the new Contested, Degraded, and Operationally Limited (CDO) space environment, the Classic Associate unit construct, and the experience it provides, could be the operational template for all CONUS GBMW sites.

This research paper will employ a Case Study framework to examine this Classic Associate unit. The background and significance section will give the reader a picture of Air Force Space Command's structure, and the 13<sup>th</sup> and 213<sup>th</sup> SWS place in it. It will provide an understanding of the Missile Warning and Space Surveillance missions, and the CDO space environment. The paper will then discuss why AFSPC is transitioning to a new SMF structure.



Finally, the introduction explains the significance of what a Classic Associate unit structure can provide to AFSPC's new SMF structure, and how experience is a key element as AFSPC navigates the new CDO space environment.

The case study provides history on Clear AFS and the creation of the Classic Associate unit. This background is beneficial to understand if other GBMW units were considered for change to a Classic Associate structure. The history transitions to the current structure between the Title 10 Active Duty and Title 32 ANG squadrons. This section also examines the Memorandum of Agreement in place between the State of Alaska, the National Guard Bureau and Air Force Space Command. It studies how this document guides employment of Title 32 ANG members, and explains how Guardsmen self-execute to Title 10 Federal duty status when operating or protecting the GBMW radar.

The analysis section will examine benefits, drawbacks, and challenges of the Classic Associate unit. The benefits found and examined are the experience levels Guardsmen and Active Duty members bring to the mission. The case study compiles 213<sup>th</sup> SWS crew force data to examine longevity, experience level, and certifications Guardsmen hold in the mission set. This data provides an aggregate look at the overall years of experience the ANG force brings to the mission. Interviews with the Director of Operations, the Superintendent, and the Chief of Standardization and Evaluations provide additional data and background as to how this experience level translates to the SMF concept and operating in the CDO space environment.

Next, the analysis section will examine drawbacks found in this Classic Associate unit structure. It examines resources needed to accomplish the mission in the use of Title 10 Military Personnel Appropriation (MPA) days when Guardsmen operate or protect the GBMW radar. Interviews with the Superintendent and the National Guard Bureau Space Functional Manager

explain the problem in securing ANG member seats at the two schoolhouse locations, and the delay this causes in certifying ANG space operators. An interview with the acting Commander of the 168<sup>th</sup> Air Wing, the 213<sup>th</sup> SWS's reporting unit, explores the drawback of career stagnation amongst Guard officers. This interview also identified a challenge to unity of command when a small installation has an Active Duty Commander who is in charge of the base, and an ANG Commander who is in charge of the Guardsmen.

The recommendation section of this paper will identify solutions to some of the drawbacks and challenges identified. The paper recommends making all CONUS GBMW sites Classic Associate units, making GBMW a "Homeland Defense" mission, creating a structured Missile Warning and Space Surveillance career path for Guard space operators, and assigning one Dual Status Commander to be in charge of Clear AFS.

The conclusion section highlights the benefits of experienced Guardsmen working alongside Active Duty Air Force counter parts, especially as AFSPC enters the new SMF construct and relies on operational experience to navigate the new CDO space environment. It closes with the finding that it is in the best interest of AFSPC, the Combatant Commander, and the National Guard Bureau to employ an Air Force and Air National Guard Classic Associate unit structure at all CONUS GBMW sites.

## **BACKGROUND AND SIGNIFICANCE**

The Missile Warning and Space Surveillance mission set is a very small segment of space operations in the AFSPC structure, but it is a strategically critical one. An overview of AFSPC structure provides background on the Ground Based Missile Warning and Space Surveillance mission performed by the 13<sup>th</sup> and 213<sup>th</sup> SWS. The background explains the new CDO space environment, which is the driving force behind AFSPC's transition to the SMF construct. The significance of operating GBMW radars with a Classic Associate unit structure is in the Guardsmen who have been at this site for more than a decade. They are able to provide the operational experience level needed for the change to SMF and operating in the CDO environment.

### **Air Force Space Command Structure**

The AFSPC provides a vast array of assets that affect warfighters across the globe. To carry out these diverse missions, AFSPC operates with two numbered Air Forces, and five operational Wings.<sup>3</sup> Reporting to AFSPC, The 14<sup>th</sup> Air Force provides space lift, operates the Global Positioning System, provides satellite communication, commands satellites through space control, and provides missile warning through both space based and ground based systems.<sup>4</sup> These mission sets provide capabilities for organizations such as the National Reconnaissance Organization (NRO), National Space Security Institute (NSSI), National Air Space Intelligence Center (NASIC), North American Aerospace Defense Command (NORAD), United States Northern Command (USNORTHCOM), the Joint Space Operations Center (JSPOC), United States Strategic Command (USSTRATCOM), and all other combatant commands around the globe.<sup>5</sup>

Under the 14<sup>th</sup> Air Force, the 21<sup>st</sup> SW provides Missile Warning and Space Surveillance capabilities for the NORAD/NORTHCOM and JSpOC Commanders.<sup>6</sup> The 21<sup>st</sup> Operations Group carries out the missile warning mission through the Defense Support Program Satellites (DSP), the Space Based Infrared System (SBIRS), and Ground Based Missile Warning Radars (GBMWR).<sup>7</sup> In unison, these assets monitor ballistic missile launches and help prevent surprise attacks on North America and its allies.<sup>8</sup> These missions are part of the Integrated Tactical Warning and Attack Assessment (ITW-AA) network, which provides attack assessments data to the NORAD/NORTHCOM Commander.<sup>9</sup> In turn, the NORAD/NORTHCOM Commander determines if the reports received represent a threat to North America.<sup>10</sup>

The 21<sup>st</sup> SW also provides capabilities for the Space Surveillance mission. The JSpOC is in charge of space surveillance, and is responsible for tracking more than 22,000 earth orbiting objects.<sup>11</sup> The JSpOC utilizes and tasks the Space Surveillance Network (SSN) to track these objects.<sup>12</sup> The SSN is comprised of 30 dedicated and collateral sites which are a mix of space based satellites, ground based optical, and ground based radar sites.<sup>13</sup> The 21<sup>st</sup> SW GBMW radars are collateral sensors to the SSN, and provide radar observations on earth orbiting objects. The observations collected by these sites and the SSN provide the JSpOC the ability to catalog and maintain positions on earth orbiting satellites, space debris, as well as predict and monitor objects reentering the earth's atmosphere.<sup>14</sup> The Space Surveillance mission provides Space Situational Awareness (SSA) for the United States and other space users around the world.<sup>15</sup> Because space has become a CDO environment, the SSA mission has taken on new critical importance in the AFSPC mission set.

The 21<sup>st</sup> Operations Group is responsible for operating and maintaining six GBMWR sites that support the Missile Warning and Space Surveillance mission.<sup>16</sup> They are: the 6<sup>th</sup> SWS

Cape Cod AFS, Massachusetts, 7<sup>th</sup> SWS Beal Air Force Base (AFB), California, 10<sup>th</sup> SWS Cavalier AFS, North Dakota, 12<sup>th</sup> SWS Thule AB, Greenland, 13<sup>th</sup> and 213<sup>th</sup> SWS Clear AFS, Alaska, and in partner with the United Kingdom the Royal Air Force Fylingdales, United Kingdom.<sup>16</sup> The 13<sup>th</sup> and 213<sup>th</sup> SWS is the only Air Force and Air National Guard Classic Associate unit in this architecture.<sup>17</sup>

The 13<sup>th</sup> SWS is the Active Duty Air Force component, responsible for operation and maintenance of base infrastructure and the GBMWR. It provides an Active Duty Commander, Civil Engineering Officer, detachment logistic and support noncommissioned officer, and six Active Duty space operators to support the Missile Warning and Space Surveillance mission. In association, the 213<sup>th</sup> SWS is the Air National Guard unit which is the force provider for the mission.<sup>18</sup> The 213<sup>th</sup> SWS provides space operators to operate the GBMWR, security forces to protect the base, a commanders support staff, services personnel, and an Alaska ANG Commander.

### **Strategic Missile Warning and the Contested, Degraded and Operationally Limited Space Environment**

The around the clock mission of Strategic Missile Warning and Space Surveillance is critical to the protection of the United States due to its continuous monitoring of space assets and ballistic missile launches from other nations. This mission ensures rapid ready response in the event of a first strike against the United States. Strategic Missile Warning is a no fail mission. From detection of a missile warning alert, GBMW crews have only 60 seconds to detect, assess, and pass a missile warning site report to the Missile Warning Center (MWC) at Cheyenne Mountain in Colorado; there can be no ambiguity or error in the report.<sup>19</sup>

The NORAD/NORTHCOM Commander is dependent on both space based and GBMW crews to pass unambiguous accurate information in order to determine if the missile warning

event presents a threat to North America. The NORAD/NORTHCOM Commander in turn notifies the Secretary of Defense, President of the United States and Prime Minister of Canada, who then decide a course of action.<sup>20</sup> The NORAD/NORTHCOM aerospace warning mission provides the governments of both the United States and Canada with an “integrated tactical warning attack assessment” on potential threats.<sup>21</sup>

The criticality of this mission cannot be overstated. If a missile event posed a threat to the United States or Canada, the first logical choice to protect either country would be an attempt to intercept the incoming Inter Continental Ballistic Missile (ICBM) using Ground Based Interceptor (GBI) missiles. These GBIs carry an Exo-atmospheric Kill Vehicle (EKV) that intercepts the ICBM warhead while it is in mid-course of flight outside of earth’s atmosphere; the EKV is a “bullet” trying to hit another “bullet”.<sup>22</sup>

GBIs may appear to present a low risk way to protect North America, but this response does actually have its own drawbacks. GBI defense is extremely expensive; each GBI costs approximately \$70 million.<sup>23</sup> If GBIs were to be used to intercept an ICBM, shot doctrine would require use of multiple GBIs in order to guarantee destruction of the threat.<sup>24</sup> In addition, GBIs are powerful intercepting missiles; other countries could mistake a GBI launch as a retaliatory ICBM strike, escalating strategic conflict.

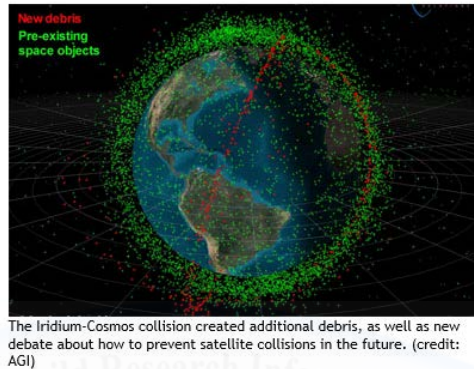
A second option in a missile warning event that posed a threat to the United States or Canada would be retaliation using our own nuclear force. The United States could use an ICBM, Sub-marine Launched Ballistic Missile (SLBM), or a nuclear bomb dropped from an aircraft. Release of nuclear weapons is an extremely dangerous option that can rapidly expand any conflict.

The 2014 *Quadrennial Defense Review Report* built priorities into the strategic framework of the Department of Defense's (DOD) defensive strategy. It stated the DOD will protect the homeland by deterring and defeating attacks on the United States.<sup>25</sup> The options of intercept or nuclear retaliation, in order to deter and defend, are significant measures with worldwide strategic implications. This is why Missile Warning is a no fail mission; GBMW crews must provide the decision maker with precise information so the proper course of action can be determined.

The new CDO space environment has brought about a renewed emphasis in Space Surveillance, and the men and women of AFPSC provide constant monitoring of the space environment and assets in it. Space was once considered a benign environment.<sup>26</sup> However, since the launch of Sputnik in 1957, there has been a race to utilize space. Since 1957, over 40,000 manmade earth orbiting objects have been identified and cataloged.<sup>27</sup> Many of these objects have reentered earth's atmosphere, but 22,000 known objects still remain in orbit, and these objects require monitoring for possible reentries, maneuvers, and to prevent collisions in space.<sup>28</sup>

To understand the importance of SSA and tracking, one only needs to look at the collision between a dead Russian Cosmos and a live Iridium satellite that occurred on 10 February 2009. During the previous week, the Satellite Object Collision Report predicted a close approach between these two satellites, but for many debatable reasons the owners of the Iridium satellite took no action.<sup>29</sup> When the two satellites collided, each one traveling at approximately 17,000 miles an hour, they created a "break-up" space event never seen before. The SSN and JSpOC tracked and cataloged over 2200 new pieces of space debris from the collision.<sup>30</sup> The debris cloud spread throughout both satellite orbits making them unusable. The debris also imposed on many other low earth satellite orbits.

Six years later, a piece of the Cosmos debris posed a possible conjunction risk with the International Space Station. The conjunction risk forced six astronauts aboard the space station to take emergency actions and stay in their Soyuz capsules until the object passed by.<sup>31</sup> Today, this debris still poses risks to the space station and other satellites in orbit.



**Figure 1: Existing Space Objects and Collision Debris Field**

Today, near peer adversaries are posing threats to space assets as well. Many of the space-based capabilities, which both the civilian and military communities have come to rely on, are under increased threat from adversaries since they can now disrupt, deny, or even destroy space-based assets.<sup>32</sup> This, in addition with more and smaller satellites being put in orbit, and a one-third increase in small space debris over the last 10 years, has caused the space environment to be termed “congested, contested and competitive.”<sup>33</sup> Match adversarial capabilities with the proliferation of a congested, contested and competitive space environment, and it produces what General Hyten, Commander of Air Force Space Command, has termed as a new challenge; operating in a Contested, Degraded and Operationally Limited space environment.<sup>34</sup>

What danger does a CDO space environment present to the civilian and military community? It presents the potential loss of countless capabilities which space provides. Maj



Patrick Slaughter with the 561<sup>st</sup> Joint Tactics Squadron provides the following definition for CDO:

*Contested operations* are defined by degradation caused by enemy action, for example, laser, direct ascent, and co-orbital antisatellite (ASATs) weapons, electronic warfare threats, cyber-attacks, and foreign space object surveillance and identification. *Degraded system operations* are defined by degradation caused by failed systems or battle damage (e.g., uplink and downlink anomalies, bus and payload anomalies and malfunctions, ground system malfunction, and mission partner system failures). *Operational limitations* are defined by reduced mission effectiveness caused by the physical or operational environment (e.g., conjunctions and collision avoidance, terrestrial and space weather, classification, decision authorities, policy, and many others).<sup>35</sup>

It is hard to imagine the civilian world without the Global Positioning System, satellite communications, or degraded internet capabilities. For the warfighter, it is even more difficult to think of operations without precision engagement, secure communication, or the intelligence gathering capabilities that space provides. The men and women of AFSPC must now prepare to operate in the CDO environment in order to maintain these space-based capabilities.

### **Air Force Space Command's Transition to Space Mission Force**

General John E. Hyten wrote a letter to his Airmen describing a needed change within the AFSPC operational world. Due to the new CDO space environment, space operators need to be experienced, flexible, and free to conduct operations in the real time environment. At a speech in December 2015, General Hyten highlighted this fact by opening his speech stating two, 19-year-old airmen, are the operators on duty flying Global Positioning System for the entire globe; he further stated “that is wrong, and about to change.”<sup>36</sup>

General Hyten's letter explained that in order to maintain space superiority and continue to be effective in space, space operations forces will transition to the Space Mission Force

structure.<sup>37</sup> The focus of SMF is to build advanced training for the threats at hand, and build space professionals with depth, knowledge, and skills in the systems they operate.<sup>38</sup> The current structure in most space operational squadrons is a split of crew operators, and a staff that provides operational support, training, and evaluations.<sup>39</sup> Under SMF, the staff will go back to being space operators; they will become part of a rotation that will spend a selected amount of time conducting operations, and then rotate off operational duties to receive advanced training on current threats and weapons system operations.<sup>40</sup> The goal of SMF is to build operators with in-depth experience in the operational environment.

Though a final SMF structure for the GBMW community has not been established yet, a conceivable notion is a six or eight month rotation performing crew duties, then a transition to three or four months of currency and advanced weapons system training, along with attendance to various schools. The goal is to build experienced operators prepared for future threats and challenges. In the Ground Based Missile Warning and Space Surveillance mission set, this means developing experienced space professionals who understand how their weapons system works, how to exploit its capabilities, and understands the space environment in which they track space objects and detect Missile Warning events.

### **The Significance of Classic Associate Units**

The critical strategic importance of the Missile Warning mission and the operational demands of the CDO space environment demand experienced space operators. The goal of SMF is the creation of space operators with in-depth experience in their weapons system. After a decade of operation, the Alaska Air National Guard crew force, instructors, evaluators and tacticians provide continuity of operations and the necessary in-depth experience SMF and CDO

environment requires. As Active Duty members rotate through their one-year remote tour at Clear AFS, they benefit from working alongside seasoned ANG operators. As realized by the 116<sup>th</sup> Air Control Wing, the first ever Active Duty and Air National Guard blended Wing, Guardsmen who have many years of experience, paired with junior Active Duty Airman, creates an “in-house” mentoring system that is extremely beneficial.<sup>41</sup>

Lt Col Matthew Morand, former 13<sup>th</sup> SWS commander, wrote a similar comment in a Peterson AFB news article titled *Total Force, Mission Partner*. In the article, Lt Col Morand wrote about the benefits Active Duty space operators gain by training and operating with the Air National Guard members who have been taking care of the mission for years; the Guardsmen provide a deep pool of knowledge that is seldom seen at other units.<sup>42</sup>

The Classic Associate unit construct provides the NORAD/NORTHCOM and JSpOC Commanders, with stable, experienced corps of operators, and it prevents dips in experience levels when newly trained personnel arrive at a GBMW site. It provides a template where younger, less experienced Active Duty Airmen benefit with instruction and mentorship from mature, seasoned, and more experienced ANG crew force. This structure could be the force enhancer propelling AFSPC’s transition to the new SMF structure and operations in the CDO space environment.

## CASE STUDY

This section provides history on Clear AFS since it is a unique TFI unit, and the only Classic Associate partnership in the GBMW architecture. If other states, the National Guard Bureau or AFSPC would consider making other GBMW sites Classic Associate units, it would be beneficial to understand the development of the Air Force and Air National Guard partnership at Clear AFS. An overview of the current 13<sup>th</sup> and 213<sup>th</sup> SWS explains the legalities of Title 10 and Title 32 status, and the command reporting structure. Finally, a review of the Memorandum of Agreement between State of Alaska, Air Force Space Command, and the National Guard Bureau details unit responsibilities and employment of Guardsmen in this mission.

### History of Clear AFS

In 2011, Clear AFS celebrated its 50<sup>th</sup> anniversary of providing Missile Warning and Space Surveillance for North America.<sup>43</sup> For 45 years, Clear AFS was solely an Active Duty remote assignment. That was up until 2006 when the Alaska Air National Guard joined the mission, creating the Air National Guard's first and only remote duty location, and the GBMW architecture's only Classic Associate unit.<sup>44</sup>

The history of Clear AFS began with the declaration of initial operations capability of the Ballistic Missile Early Warning System (BMEWS) in 1961.<sup>45</sup> Clear AFS reported to the 2<sup>nd</sup> Detachment of the 71<sup>st</sup> Missile Warning Wing.<sup>46</sup> The base comprised of a mix of Active Duty Air Force, DOD civilians, and civilian contractors running the mission. In 1961, the BMEWS radar provided Ballistic Missile Early Warning, and tracked space objects.<sup>47</sup>

As the mission grew, Clear AFS saw many squadron re-designations and system changes. The first re-designation was to the 13<sup>th</sup> Missile Warning Squadron in 1967.<sup>48</sup> In 1983, the

BMEWS system received a major upgrade for storage of space object orbital element sets, used to track earth-orbiting objects; after this upgrade, the radar was tracking over 8,000 manmade objects.<sup>49</sup> 1992 brought another squadron designation change when Clear AFS transitioned to become the 13<sup>th</sup> Space Warning Squadron.<sup>50</sup> As the BMEWS mechanical radar reached the end of its life in the late 1990s, a replacement came in the way of a Solid State Phased-Array Radar System (PAVE-PAWS) which came from El Dorado Air Station in Texas.<sup>51</sup>



**Figure 2: From Left to Right, BMEWS and PAVE-PAWS Radars**<sup>52</sup>

The new PAVE-PAWS radar was disassembled in Texas, transported, and reassembled at Clear AFS; it declared initial operations capability in 2001.<sup>53</sup> The new PAVE-PAWS system was smaller, more energy efficient, and provided greater tracking capabilities. As seen in Figure 2 on the right, the radar has two faces capable of covering a 240-degree wide area, which can track objects 3000 miles into space.<sup>54</sup>

The mission remained an Active Duty Air Force remote short tour assignment. Air Force personnel came to perform a 12-month tour, unaccompanied by any dependents. Continuity of the base and its infrastructure remained with civilian contractors who lived in Fairbanks, Anchorage, or the local area. The unit structure remained this way until the first Alaska Air National Guardsman arrived in 2003.<sup>55</sup>

## **How the Classic Associate Unit was Created at Clear Air Force Station, AK**

In 1999 and 2000, the Alaska National Guard was looking for ways to expand into new mission sets.<sup>56</sup> At a Commanders conference in Colorado, an idea surfaced for Air National Guard augmentation of AFSPC missions. The Alaska National Guard seized the initiative and offered to collaborate in the GBMW mission at Clear AFS, and by 2003 started slowly integrating Guardsmen into the GBMW mission.<sup>57</sup>

Lieutenant General Craig Campbell became the Alaska National Guard Adjutant General in 2003, and it became his responsibility to acquire more Active Duty Guard Reserve (AGR) authorizations in order to provide staffing for Clear AFS. As Lieutenant General Campbell acquired more billets from the National Guard Bureau for operations, security, support, and services, the Alaska Air National Guard eventually had enough members at Clear AFS to become a squadron. On 14 April 2006, the Alaska Air National Guard's 213<sup>th</sup> Space Warning Squadron received Federal Recognition.<sup>58</sup> In addition, the 13<sup>th</sup> and 213<sup>th</sup> SWS became partner units under a Classic Associate unit recognized by Headquarters Air Force.<sup>59</sup>

Guard integration was carried a step further with a thought that the Alaska Air National Guard could possibly take over GBMW operations at Clear AFS.<sup>60</sup> The idea was brought up to AFSPC, and a support agreement was made between the State of Alaska and AFSPC; the transition started in 2007.<sup>61</sup> From mid-2007 through 2008, the last remaining Active Duty space operators and security forces members left Clear AFS; the 13<sup>th</sup> SWS Commander and Mission Assurance Officer were the only remaining Active Duty Air Force members on the installation, but this would change.

In February 2010, General C. Robert Kehler, Commander of Air Force Space Command, was touring Clear AFS and decided he would like to have at least six Active Duty space

operators perform one-year remote tours at Clear AFS; General Kehler wanted future leaders in the Space Command architecture who have had tours or experience with Clear AFS.<sup>62</sup> The first six Active Duty space operators started working at Clear AFS in 2011. To date, Clear AFS operates under this construct. There are six Active Duty and two Royal Canadian Air Force space operators who rotate through Clear AFS on one-year remote tours; Alaska Air National Guardsman make up the rest of the space crew force.

An important note is that Clear AFS was not the only Active Duty mission set the Alaska National Guard (AKNG) was examining for partnerships. The AKNG was seeking out other missions, which it considered “Homeland Defense.”<sup>63</sup> In this, the AKANG was working on activating an Army National Guard unit to operate the Missile Defense Agency’s Ground Based Interceptor Battalion at Ft. Greely Alaska.<sup>64</sup> The 49<sup>th</sup> Missile Defense Battalion at Ft. Greely, Alaska activated in 2004, becoming the first of its kind unit comprised of only Alaska National Guardsmen conducting a “Homeland Defense” mission.<sup>65</sup>

When viewing associate units, there are many differences between the Air Force and Air National Guard chains of command. Active Duty Air Force members report through a federal chain of command, while National Guard members report through a State chain of command. Due to the differences in duty statuses and reporting statuses, it is important to understand how the Total Force structure works, and what the differences are between partners in associate units.

### **13<sup>th</sup> and 213<sup>th</sup> Space Warning Squadron Total Force Unit Structure**

The 13<sup>th</sup> Space Warning Squadron is an Active Duty Air Force Squadron and falls under United States Code (USC) Title 10; its military members are on full-time duty in the active service of the United States.<sup>66</sup> These members report to the Secretary of Defense, who in turn



reports to the President of the United States.<sup>67</sup> The 13<sup>th</sup> SWS commander is the Title 10 installation commander who is responsible for all aspects of the base and the GBMW mission. The 13<sup>th</sup> SWS is the owner and operator of base infrastructure and is responsible for funding operations and maintenance costs for the installation, and responsible for contract oversight of various support functions. Active Duty military personnel are subject to change duty stations every one to six years based on the needs of the Service. Remote tour, unaccompanied assignments, are one-year tours.<sup>68</sup> Clear AFS is considered a remote tour assignment, therefore the Active Duty Air Force members assigned to the 13<sup>th</sup> SWS are on a one-year remote tour, and are not allowed to bring dependents to this assignment.

The Air Force is responsible for the GBMW Title 10 mission, as such the 21<sup>st</sup> SW, 14<sup>th</sup> Air Force, and AFSPC ensures compliance and mission accomplishment through base level exercises and inspections. Regulations and guidance for mission accomplishment flow from various Federal organizations such as AFSPC, USSTRACCOM, NORAD/NORTHCOM, Joint Functional Component Command (JFCC) Space, 14<sup>th</sup> Air Force and the 21<sup>st</sup> SW.

The 213<sup>th</sup> SWS is an Alaska Air National Guard Squadron, and falls under USC Title 32; it reports to the Alaska Adjutant General, who in turn reports to the Governor of Alaska.<sup>69</sup> With the exception of a few members who are Drill Status Guardsmen, the Guardsmen at Clear AFS are on Active Guard and Reserve (AGR) Duty status. These Guardsmen are ordered to active duty for a period of 180 days or greater, and are in AGR status to train and organize the unit to be a force provider for the 13<sup>th</sup> SWS.<sup>70</sup>

The 213<sup>th</sup> SWS provides 90 percent of the military staffing at Clear AFS. Under the Classic Associate unit construct, the 213<sup>th</sup> SWS is the force provider for security of the installation and radar, the space operators, instructors, evaluators, and tacticians, and also support



functions in the Commander's support staff and services sections. There is a 213<sup>th</sup> SWS commander assigned to Clear AFS who is responsible for all Alaska Air National Guard members in Title 32 status.

Unlike their Active Duty Air Force counterparts, Alaska National Guardsmen do not have to change duty stations; exceptions would be in cases where the Secretary concerned would federally activate a Guardsman to deploy or perform a specified mission. Guard units around the country are often termed "home-grown" in that many Guard members enlist or commission in their home unit, grow and advance in that unit, and eventually retire from that same unit. Clear AFS falls under this "home-grown" ideal with one exception; most Alaska Air National Guardsmen that come to Clear AFS are on their second reenlistment or orders, and hence considered career members.

The National Guard is unique because it is a State Militia and a Reserve Component of the United States. As a Reserve Component, Alaska National Guardsmen can be ordered to Federal Title 10 Active Duty by the Secretary concerned under USC § 12310.<sup>71</sup> The most common call up of Guardsmen is mobilization or orders to Title 10 status for specified operations. The GBMW mission is a Federal Title 10 mission, but ANG members are not activated to perform this mission. By law, Guardsmen not ordered to Title 10 status under USC § 12310, cannot protect or operate the GBMWR. Since the 213<sup>th</sup> SWS Guardsmen are on Title 32 AGR orders over 180 days long, and report to the Governor of Alaska, security forces members protecting the radar, and space operator who assume shift to perform the Federal Missile Warning mission transition from Title 32 to Title 10 status in order to perform these specific Federal duties.

These Guardsmen self-execute to Title 10 status for their specified shift under Title 10 USC § 12301 (b) and (d), which requires consent from the Governor of Alaska for the individual to perform Federal duty for that period.<sup>72</sup> These Guardsmen report to the 13<sup>th</sup> SWS Active Duty Commander, Secretary of Defense, and President of the United States while in this duty status. Once the security forces member or space operator finishes shift, they revert to Title 32 Status the next duty day, falling back under the 213<sup>th</sup> SWS ANG Commander and Governor of Alaska. An important note is Guardsmen volunteer to perform Federal duty, and the Secretary concerned does not order them to duty for the specific shift they pull.<sup>73</sup>

Air Force Instruction 90-1001, *Responsibilities for Total Force Integration*, states Memorandums of Agreement (MOA) will define triggers for when a Guard member enters and exits Federal duty status.<sup>74</sup> With any collaboration or partnership, specific functions in the unique partnership between AFSPC and the Alaska National Guard required definition in writing. Two Memorandums of Agreement exist to guide unit interaction between the 13<sup>th</sup> and 213<sup>th</sup> Space Warning Squadrons.

### **Memorandum of Agreement**

Total Force Integration MOAs are agreements between the host and associate organizations; they provide details about chain of command, mission, tasking authorities, day-to-day functional roles, facility and equipment usage.<sup>75</sup> Creation of the Classic Associate unit at Clear AFS required a MOA between the State of Alaska, The National Guard Bureau, and Air Force Space Command. Additionally an MOA was drafted between the 21<sup>st</sup> SW and the 168<sup>th</sup> Air Refueling Wing (ARW), the parent Wings of the 13<sup>th</sup> and 213<sup>th</sup> SWS.

The MOA between the State of Alaska, The National Guard Bureau, and Air Force Space Command governs the employment of the 213<sup>th</sup> SWS at Clear AFS.<sup>76</sup> It states that the

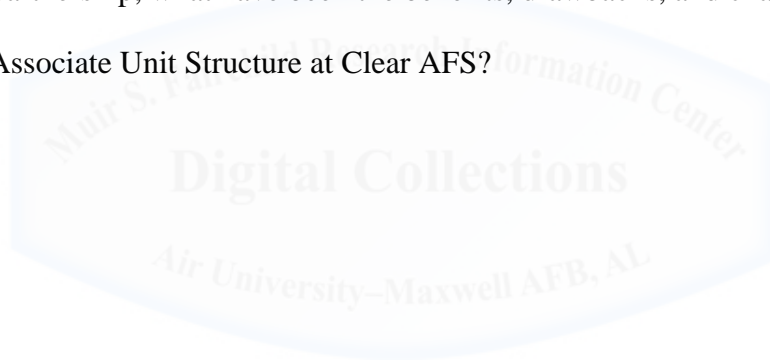
purpose of the ANG at Clear AFS is to operate and protect the radar. In addition, the MOA identifies 213<sup>th</sup> SWS responsibilities. These include responding to state emergencies when ordered by the Governor Alaska, providing assistance to other elements of the Air National Guard and Regular Air Force, and providing training to Air Force Active Duty personnel in Missile Warning, Space Surveillance, Security, and other areas of Air National Guard expertise.<sup>77</sup> In addition, the MOA explains and defines the Title 32 mission of the Air National Guard, and Title 10 Federal mission.<sup>78</sup>

The MOA defines the command and supervisory relationship between the Alaska National Guard and Active Duty Air Force members on Clear AFS. It states the Missile Warning and Space Surveillance mission is under control of the President of the United States and flows through the control of the combatant commander chain of command; as such, individuals performing or protecting the mission must be in Title 10 status.<sup>79</sup> 213<sup>th</sup> SWS Airmen, when performing or protecting the Federal mission, will fall under control of the 13<sup>th</sup> SWS Active Duty Commander.<sup>80</sup> All Administrative and disciplinary control of 213<sup>th</sup> SWS Airmen will fall under the State of Alaska, with the exception of Title 10 mission performance, in which case administrative and disciplinary actions would fall under the 201<sup>st</sup> Mission Support Squadron, Air National Guard Headquarters of the United States.<sup>81</sup>

The MOA further defines two important aspects in relation to the Federal mission. First, it states that due to the constant requirement to provide Missile Warning protection for North America, the Federal mission and orders directed by the Title 10 chain of command will have “primacy” over orders originating from the Title 32 state chain of command.<sup>82</sup> The MOA defines the trigger points when Title 32 Guardsmen transition to Title 10 for operating and protecting the GBMW radar. To do this, the MOA provides Governor’s advanced consent for Alaska Air

National Guardsmen to voluntarily perform the Federal Title 10 mission, as required by Title 10 USC § 12301 (b) and (d).<sup>83</sup>

If other states, the National Guard Bureau, and AFSPC were to consider TFI units at the other CONUS GBMW units, this section provided history of the unit, how the Classic Associate unit structure evolved at Clear AFS, and the differences in status between the 13<sup>th</sup> and 213<sup>th</sup> SWS. The discussion on the MOA provides a template on employment of Guardsmen in the mission, and defines reporting and chain of command authority between the two squadrons. Decision makers may wonder why do this, what is there to gain? The analysis section of this paper attempts to answer this question by asking: after a decade of this Air Force and Air National Guard partnership, what have been the benefits, drawbacks, and challenges of operating under a Classic Associate Unit Structure at Clear AFS?



## **ANALYSIS**

A decade of operating under a Classic Associate unit construct has brought to light benefits, drawbacks, and challenges of this structure. This analysis concentrates on the crew force operating the Missile Warning and Space Surveillance mission. It examines the benefits of Guard mission experience levels, what Active Duty outside experience brings to the Guard, and how Guardsmen experience is beneficial to SMF in the new CDO space environment. The analysis discovered drawbacks of the structure in the use of Title 10 MPA days, getting newly hired Guardsmen to space and radar qualification training, and career stagnation of Guard officers. In addition, it identified a challenge in unity command by having two commanders at one base.

### **Benefits of the Classic Associate Unit at Clear Air Force Station**

Analysis identified three key benefits of the Classic Associate at Clear AFS. Guardsmen with as many as 12 years of experience in this mission set provide comprehensive and in-depth knowledge in crew operations and staffing functions. Active Duty space operators who rotate through on a one-year remote tour provide Guardsmen a diverse and broader perspective of various space mission sets and backgrounds, which provides outside views and thoughts to find solutions to problems. Finally, many Guardsmen have worked in the space mission set long enough to have witnessed the evolution of the CDO environment and know the background of the space events that have brought space to this point.

### **Air National Guard Experience Levels**

The most beneficial aspect of operating under the Classic Associate unit structure at Clear AFS is the experience levels Guardsmen bring to the Ground Based Missile Warning and

Space Surveillance mission set. As of December 2015, Guardsmen at Clear AFS had an overall average of over 5.8 years of experience operating the GBMWR; many of these Guardsmen are the instructors and evaluators in the unit.<sup>84</sup> One member is a prime example of in-depth operational experience in the mission set; Captain Eric Vantrease has been with the unit since 2003.<sup>85</sup> Further breaking down the Guard years of experience, there are two space operators with over 10 years of experience operating Clear AFS's radar, eight operators had between six and nine years of operational experience, and the rest had between one and three years of experience in this mission.<sup>86</sup>

These experience levels not only provide live mission experience, but also translate to the staffing functions required to perform the operational mission. Each GBMWR contains a Director of Operations, Superintendent, and operations support, training, standardization and evaluation, and weapons and tactics section. All of these staffing functions have Guardsmen with significant mission and staffing experience as heads of each section.<sup>87</sup> The 2015 data revealed that the officers and noncommissioned officers in charge of all these sections had an average of 6.1 years staffing and operational experience in the GBMW mission.<sup>88</sup>

Another necessity of operating the GBMWR is having personnel with instructor, evaluator, tactician or weapons system test controller certification and experience. When a member receives certification in one of these four functions, excluding test controller, they move into that particular section to perform the staffing function, or stay on crew and become a "line" instructor, evaluator, or tactician. The benefit of having experienced members in these positions is that over years of operating in the same unit, these members gain experience in events that may only happen once every couple of years, and these members witness how changes in the operational environment drive changes in operating practices.

In the December 2015 data capture, 80 percent of Guard space operators hold, or have held, certification in one of the four categories.<sup>89</sup> Of the operators holding additional certifications, 57 percent of these hold, or have held, certifications in more than one function; three of these members have held certifications in all four functions.<sup>90</sup> In addition, it is also important to point out that having Guardsmen with years of experience in one mission set provides the opportunity to gain experience in each of these functional areas.

Captain Vantrease is one example of an Alaska National Guardsman with vast experience working at Clear AFS. Captain Vantrease provides multi-layered experience in the mission set, many of the staffing positions, and in all four certifications areas. During an interview, he relayed his history in the unit. Starting out as an enlisted space operator at Clear AFS, he quickly became proficient at crew operations. He applied for an opportunity to become an officer, and commissioned in a Crew Commander billet.

In his 12 years at Clear AFS, Captain Vantrease has held certification as an instructor, evaluator, tactician, and test controller. He has been a line instructor, and has worked in the operations training, standardization and evaluation, and the weapons and tactics office.<sup>91</sup> He relayed he has over 1000 Missile Warning and Space Surveillance alert shifts.<sup>92</sup> His in-depth knowledge is hard to match; and is an indispensable asset to the Active Duty counterparts he works with. Captain Vantrease is a key example of the amount of experience a Guardsman can gain in, and provide to, a mission set.

This level of in depth experience provides the Missile Warning and Space Surveillance mission a force mix of veteran Guardsmen, who are ready and available to share their knowledge of the weapons system and mission with their Active Duty counterparts. Whenever possible, Guardsmen, like Captain Vantrease, pair with Active Duty members on crew rotation; this

provides the crew with a veteran Guard operator who has experienced many of the real world operational scenarios not captured in the training or evaluation environment. Experienced Guardsmen provide the in-depth knowledge and training to the Active Duty members who rotate through Clear AFS on a one-year tours, and the comprehensive knowledge gained in such a short time can be utilized throughout the Active Duty member's career.

### **Outside Experience working with Active Duty**

Active Duty space operators strengthen the Classic Associate construct by bringing operational experience from other space mission sets. Clear AFS has capitalized on this outside experience by having these Active Duty members present briefings on their past assignments.<sup>93</sup> The experiences shared provides a broader view of how the GBMW radar at Clear AFS contributes to both the Missile Warning and Space Surveillance missions.

Active Duty members have come from the JSpOC, where Clear AFS sends their satellite observation data; this provides Guardsmen with knowledge on the creation of mission plans and the space taskings they receive.<sup>94</sup> Other members have come from the Space Based Infrared System, which is another component of the Missile Warning architecture, and they provide Guardsmen with an understanding of the dual phenomenology of space based and ground based Missile Warning. One member came from Clear AFS's sister site Cape Cod AFS, which operates the same weapons system, and this member provided in-depth knowledge of different operational practices from a like weapons system.<sup>95</sup> Clear AFS has also benefited from having members come from the 21<sup>st</sup> SW training and evaluations sections, providing up to date guidance, inspection preparation, and knowledge from the Wing and Group level.<sup>96</sup> In addition, operators have come from various satellite command and control missions throughout AFSPC,



providing extensive knowledge on how satellite command and control functions integrate with observational data from Clear AFS.<sup>97</sup>

The diversity of operational backgrounds the Active Duty brings provides the Guardsmen a perspective of how other units conduct space operations outside of the GBMW architecture. Diversity brings novel approaches and ideas to solve operational issues experienced at Clear AFS. Thomas Roosevelt's book, *Beyond Race and Gender, Unleashing the Power of Your Total Work Force by Managing Diversity*, discusses the need to identify external sources to provide skills and diversity needs for the organization.<sup>98</sup> In the Classic Associate construct, the Active Duty operators provide outside skill sets and viewpoints, which benefit the Guardsmen in continual processes improvement. It breaks up "group think" and often provides an outside of the GBMW "box" thought process that benefits the members and the mission.

### **Guard Experience in the Contested, Degraded, Operationally Limited Space Environment**

AFSPC is keenly focusing on the new CDO space environment and it is driving the transition to the Space Mission Force construct. Many of the Guard space operators at Clear AFS have been performing the Missile Warning and Space Surveillance mission while significant events in space have forced the evolution of the CDO environment. In turn, the experience of witnessing this evolution makes these Guardsmen catalysts for the SMF construct's advanced training goals of producing experienced Active Duty space tacticians.

The proliferation of space is one factor in creating the CDO space environment.<sup>99</sup> There are also two other specific events, which have contributed to the creation of this environment: the Chinese Anti-Satellite test in 2007, and the collision of the Iridium and Cosmos satellites in

2009.<sup>100</sup> The Space Surveillance Network, which Clear AFS is a part of, has been tracking these events as they unfolded.<sup>101</sup> Reviewing the experience level data, it is evident that many Guardsmen have seen how these events have changed the dynamic of the space environment.

Guardsmen who have seen these events are now the instructors, evaluators, and tacticians, which train and mentor the Active Duty space operators who rotate through Clear AFS. As General Hyten stated, the focus of SMF is to build advanced training for the threats at hand, and build space professionals with depth, knowledge, and skills in the systems they operate; the Guardsmen at Clear AFS are already the space professionals General Hyten needs for his SMF concept.<sup>102</sup>

In 2014, Rand Corporation produced a study titled, *Suitability of Missions for Air Force Reserve and Components*. The study comments on the benefits of Reserve component forces in the space mission set:

The demands for many activities in the space community are relatively constant: conducting command and control for different satellite systems, maintaining vigilance via orbiting and ground-based warning systems, tracking and reporting about space objects, and so on. Even so, reservists and Guardsmen already contribute in many of those areas, providing subject-matter expertise and capacity for out-of-the-ordinary or intermittent surges—e.g., for satellite constellation changes, resolution of anomalies, or system transitions.<sup>103</sup>

Guardsmen can provide the critical element of “experience” and “subject-matter expertise” to the SMF construct. As crews rotate from mission operations periods, to advanced training periods, Guard space operators can provide continuity of operations, advanced training, and in-depth, “reach back” experience, to help form the mission plans and advanced training necessary for future CDO events.

Having members with more than 1000 alert shifts, experience in multiple staffing and crew functions, and experience in the CDO environment provides a pool of veteran, experienced

space operators at Clear AFS. These members are ready to pass this knowledge onto their Active Duty counterparts who perform their one-year remote tour. Even with the benefits of continuity of operations, years of experience in operation of the radar weapons system, and the ability to provide advanced training under the SMF construct, analysis identified a few drawbacks to the Classic Associate structure.

### **Drawbacks of the Classic Associate Unit at Clear Air Force Station**

Analysis identified three drawbacks to the Classic Associate unit structure. Every time a Guardsman assumes shift to protect or operate the radar, it requires a Title 10 Military Personnel Appropriation day from AFSPC. The Air National Guard has experienced multiple month delays in getting newly hired Guardsmen to required certification training schools. There is also a significant drawback is the career stagnation of Guard officers, which the 213<sup>th</sup> SWS is now facing after a decade of operating under the Classic Associate construct.

### **Title 10 Military Personnel Appropriations Days**

Guardsmen transition from Title 32 to Title 10 status to operate or protect the Missile Warning radar. Under Title 10 USC § 12301(d), when a Guardsman voluntarily transitions from Title 32 to Title 10, that Guardsman is no longer performing duties for the Air National Guard.<sup>104</sup> Even though transition to Title 10 is voluntary, the Guardsman is now considered part of the Active Duty force, and counts against a Military Personnel Appropriations day.<sup>105</sup>

Air Force Instruction (AFI) 90-1001, *Responsibilities for Total Force Integration*, is the governing instruction on how to account for Title 10 MPA days. The instruction states when an ANG member performs Federal duty in a Title 10 status, a process must be in place to track the

man-hours worked in support of the mission.<sup>106</sup> There are two acceptable methods used to track these man-hours. The first is publication of a Title 10 order for the period of duty worked.<sup>107</sup> The second is an aggregate tracking method where periodic reconciliation is used.<sup>108</sup>

The Guardsmen at Clear AFS are on Title 32 AGR orders, and since they self-execute to Title 10 status to perform the federal mission, an aggregate reimbursement process is in place. The 213<sup>th</sup> SWS submits a monthly report accounting for number of shifts Guard members performed in support of the Federal mission. The report goes to the AFSPC Director of Manpower and Personnel, who is responsible for verifying and justifying work force requirements.<sup>109</sup>

A drawback for the AFSPC Director of Manpower and Personnel is that the Program Objective Memorandum (POM) cycle must forecast and account for MPA days. This in itself is not difficult because a standard projection views the number of Guardsmen assigned to Missile Warning crews, the number of required proficiency shifts for staff personnel, and the number of Security Forces members required to protect the radar, on a monthly basis. Where it becomes difficult, and causes resource issues for AFSPC, is the reactionary nature of the Ground Based Missile Warning and Space Surveillance mission.

Specific missile or space events may require an increase or surge of crewmembers in order to process an event; the additional crewmembers usually come from the staff offices, which mostly Guardsmen. Each time this surge is needed, additional MPA days are used. These events cannot be forecasted, and often cause AFSPC to redistribute MPA allocations amongst the various space Total Force units. AFSPC A2/A3A6, Man Power and Personnel Directorate, provide this research project a MPA “POM forecast versus actual used” slide. The data revealed that between 2010 and 2013 an additional 6328 MPA enlisted days were needed to cover

unforeseen events; in contrast, 3273 MPA officer days were not used, and 2014 and 2015 usage dropped due to two-man crew operations.<sup>110</sup> The reason for the difference in officer and enlisted MPA days is often due to a personnel surge for specific space events, and this surge usually comes from the enlisted force.

### **New Hire Air National Guard Qualification Training**

Getting newly hired Guard space operators to qualification training in a timely manner is a problem. When a 213<sup>th</sup> SWS space operator position becomes vacant, the unit advertises the position. The unit reviews applications and applicants interview for the position. Subject to change per the commander's discretion, most advertisements for the 213<sup>th</sup> SWS do not require prior space experience, or a "Space" Air Force Specialty Code (AFSC), as a prerequisite for selection in the position. As of December 2015, 78 percent of the current Guard space operators at Clear AFS did not have a "Space" AFSC when hired.<sup>111</sup>

Each newly hired Guardsman who does not have a previous "Space" AFSC must attend Undergraduate Space Training (UST) and Space Operations Initial Qualification Training (IQT).<sup>112</sup> UST is a six-week course that introduces new space professionals to the space environment and the space operational career field.<sup>113</sup> UST is followed by a six-week IQT course in Missile Warning and Space Surveillance operations.<sup>114</sup> When the member returns from IQT, he or she will receive another 18 days of Mission Qualification Training (MQT) at the unit; upon completion the member is declared Crew Mission Ready (CMR) and is able to perform the mission.

Historically, there has been a significant delay from the time a new Guard space operator was hired to the time he or she is declared CMR. From available data on current Guard operators

who required both UST and IQT when hired, it took 10 members an average of 7.6 months from in-processing the unit, to attend and return from UQT and IQT and start local MQT training; UQT and IQT only take three months to complete; a member could complete MQT and be certified in four months.<sup>115</sup> Of this, it took three members over 11 months to start MQT from point of hire.

The reason for this significant delay is the lack of Air National Guard School slots available to newly hired members. In Fiscal Year 2016, the Air National Guard received only six UST slots.<sup>116</sup> In addition to the few slots allotted, the ANG is in competition with the Active Duty Air Force and Air Force Reserve for available seats at the space schoolhouse. As of December 2015, there are three newly hired Guard space operators at Clear AFS who have not attended UST, and there are no available training seats for them through the end of the Fiscal Year.<sup>117</sup>

### **Air National Guard Career Stagnation**

Analysis revealed that after decade of operating under this construct the most significant drawback to the Classic Associate construct is career stagnation of Guard officers. Officer development is critical when growing the next Directors of Operations, Commanders, or leaders of Squadrons, Groups, or Wings. A well-structured Officer Professional Development (OPD) plan develops well-rounded, competent officers who are ready to assume future leadership roles.<sup>118</sup> Currently, the officers at Clear AFS do not have a well-structured OPD plan.

Colonel Torrance W. Saxe, former 13<sup>th</sup> and 213<sup>th</sup> squadron commander, and currently the acting 168<sup>th</sup> Air Wing Commander, identified career stagnation as a problem during an interview. As of now, there is no structured path to grow Guard space operations officers. Internally they move from one office function to another position every two years, and that

grows great GBMW operators, but not well-rounded officers who bring skills and experiences gained outside of the mission set.

ANG officers at Clear AFS must look for Statutory Tours or Active Duty for Operational Support Tour opportunities outside of Alaska in order to find professional growth opportunities; often these tours have no association with the space career field.<sup>119</sup> Colonel Saxe's idea to remedy this problem would be to work through the National Guard Bureau to create career growth opportunities for the officers at Clear AFS. This would require the creation of Title 10 or Title 32 Statutory Tours at AFSPC Headquarters, the 21<sup>st</sup> SW, and the UST or IQT schoolhouse.<sup>120</sup>

### **Challenges of the Classic Associate Unit at Clear Air Force Station**

Clear AFS operates with one Active Duty and one Air National Guard Commander, and this dilutes and complicates unity of command. There is a term amongst the military community called "one base, one boss." The concept is with one person in charge, it reduced the chances of conflicting intent or orders passing out to subordinates in the unit. With two commanders at Clear, there is potential for this concept to be lost.

### **Unity of Command with Two Squadron Commanders**

Every year Clear AFS welcomes a new Active Duty Commander as the position rotates because of the 12-month remote tour cycle. The Air National Guard Commander remains in the position for two to three years, depending on the next job assignment or retirement after completion of the tour. There is a significant learning curve for each new 13<sup>th</sup> SWS Active Duty Commander as he or she is not only responsible for the mission, but also the entire installation.

In one way, having the Air National Guard Commander already in place eases the transition of the new Active Duty commander, as he or she has a peer to confer with when questions or problems arise. An opposite view of this is having two commanders who have their own viewpoints on how to manage people and problems. In yet a different sense, people must answer to two commanders; but not always, and this can cause frustration and confusion. Colonel Saxe, acting 168<sup>th</sup> Air Wing Commander, touched on this topic during an interview.

Colonel Saxe stated the Active Duty Commander in Title 10 Status has no legal authority over Title 32 Air National Guardsmen; he or she only has legal authority over Guardsmen when they have converted to Title 10 status in order to operate or protect the GBMW radar.<sup>121</sup> On the same level, the Title 32 Air National Guard Commander has no legal authority over the Title 10 Active Duty members. In addition, the Guard Commander loses control of the Guardsmen who convert to Title 10 to operate or protect the radar, which means he or she has no say in disciplinary issues that may arise while the Guardsman is in Title 10 status.<sup>122</sup>

AFDD 1, *Air Force Basic Doctrine*, discusses unity of Command. It states that coordination between two commanders, such as the case at Clear AFS, may result from cooperation; however, coordination is best when a single commander has the authority and capability to direct “all” forces in the pursuit of a single and common objective.<sup>123</sup> AFDD 1 goes on to state that many operations have multiple agencies involvement, such as the Active Duty Air Force, Air National Guard, and Royal Canadian Air Forces at Clear AFS, which may dilute unity of command.<sup>124</sup> Mission accomplishment requires multiple agencies and the capabilities they bring; centralized control and unity of command is essential to efficiently and effectively carry out the mission.<sup>125</sup>



The analysis has shown that the benefits in experience level operating under a Classic Associate unit structure at Clear AFS are significant. The experience level which the Guardsman provide to the Active Duty, the outside experience the Active Duty members bring to the Guardsmen, and the in-depth knowledge Guardsman have operating in the CDO space environment. However, there are drawbacks and challenges to the construct in the ways of MPA day usage, the time it takes to get a new Guard space operator certified, career stagnation of Guard officers, and having two commanders at one site. This paper offers some recommendations to these drawbacks and challenges.



## RECOMMENDATIONS

Based on the case study and analysis of the Classic Associate unit structure at Clear AFS, this paper offers four recommendations. They are: Make all Ground Based Missile Warning and Space Surveillance sites in the CONUS Classic Associate units, make GBMW a “Homeland Defense” Mission, create an Air National Guard Ground Based Missile Warning and Space Surveillance career path, and assign one Dual Status Commander to be in charge of Clear AFS. These recommendations can streamline and strengthen the Classic Associate structure.

### **Make all Continental United States Ground Based Missile Warning Sites Classic Associate Units**

Missile Warning is a “no fail” mission and Space Surveillance faces new challenges in the CDO space environment. As AFSPC prepares to transition to the SMF construct, it will need experienced space operators ready to lead mission planning and provide advanced training. The Classic Associate unit construct in place at Clear AFS provides a model where veteran Guard members can provide the “subject matter expertise” needed to build an experienced GBMW crew force.

The Guard space operators at Clear AFS already provide a ready-experienced crew force with an average of over five years of experience operating the GBMW radar. This experience level directly translates to an in-place crew force, which not only provides continuity of operations, but also provides mentorship and in-depth knowledge on the weapons system from which junior Active Duty space operators can quickly learn. Guardsmen with as many as 12 years of experience in the mission have witnessed the evolution of the CDO environment, and have knowledge and experience in previous catastrophic space events. They provide an in-depth

mastery of operational experience ready to be the future mission commanders, instructors, and tacticians in the SMF construct.

In turn, Active Duty space operators bring outside space experience to the Guardsmen at; this provides the benefits of a diversely experienced crew force, which can approach new challenges from many different angles and experiences in space operations. Many experiences the Active Duty space operators bring from outside the GBMW mission set provide novel approaches to problems that arise. These Active Duty space operators then carry on the experiences gained at the unit to their next space assignments.

By adding Guardsmen to the other CONUS GBMW radars at Beal AFB, California and Cape Cod AFS, Massachusetts, a rotational path could be created where Active Duty members who complete tours at Beal and Cape Cod would follow on to a remote tour at Thule AFS Greenland. This notional model would provide experienced GBMW operators ready to assume the mission tour at Thule AFS, without the need for additional training, or a drop in experience level when a member arrives directly from the schoolhouse.

AFSPC and the States of California and Massachusetts could use the template at Clear AFS to create Classic Associate units at their GBMW units. Title 10 USC § 12301 (b) and (d) is already in place for Guardsmen to self-execute to Title 10 status to voluntarily operate and protect the Federal Missile Warning and Space Surveillance mission.<sup>126</sup> The MOA between Air Force Space Command, the State of Alaska, and the National Guard Bureau could also be a template for conditions of employment of Guardsmen at these other units. The Classic Associate unit construct employed at these sites would provide NORAD/NORTHCOM, USSTRATCOM, and the JSpOC a relevant and reliable crew force mixture of experienced Air National Guard and Active Duty Air Force GBMW space operators.

## **Make Ground Based Missile Warning a Homeland Defense Mission**

The Classic Associate unit construct at Clear AFS would not need to use MPA days if GBMW aligned under a “Homeland Defense” mission. Strategic Missile Warning provides detection and warning of ICBMs and SLBMs that pose a threat to the United States and Canada. “Homeland Defense includes missions such as domestic air defense, maritime intercept operations, land-based defense of critical infrastructure and assets, and, when directed by the President or the Secretary of Defense, the protection of US and its territory from attack.”<sup>127</sup> The Missile Warning mission carried out by the GBMW radars protect the United States from attack, hence with a directed change, the mission could align under “Homeland Defense.”

Currently, Clear AFS is undergoing a weapons system upgrade to become an Upgraded Early Warning Radar (UEWR); UEWR will tie it into the Missile Defense Agencies (MDA) Ballistic Missile Defense System (BMDS) and provide targeting data to the GBI missiles at Ft. Greely Alaska.<sup>128</sup> At Ft. Greely, the Alaska Army National Guard’s 49<sup>th</sup> Missile Defense Battalion is conducting a “Homeland Defense” mission.<sup>129</sup> As the radar at Clear AFS integrates with the 49<sup>th</sup> Missile Defense Battalion, it will tie into this “Homeland Defense” mission as well.<sup>130</sup>

Chapter 9 of United States Code Title 32 covers the National Guard and Homeland Defense activities. § 901 provides a definition for the term “homeland defense activity” and it states:

The term “homeland defense activity” means an activity undertaken for the military protection of the territory or domestic population of the United States, or of infrastructure or other assets of the United States determined by the Secretary of Defense as being critical to national security, from a threat or aggression against the United States.<sup>131</sup>

Section § 904 of this chapter further explains that full-time active Guardsmen “may support or execute” homeland defense activities executed by the National Guard.<sup>132</sup> Homeland defense is a mission right for the Air National Guard, and this mission set would only be better from the benefits provided by an Air National Guard and Air Force Classic Associate unit structure.

### **Create an Air National Guard Ground Based Missile Warning Career Path**

There is a need for structured career growth of Air National Guard space officers. Taking and tweaking an idea from Col Chris D. Crawford and Col Kevin J. McLaughlin written in the *High Frontier, The Journal for Space and Cyberspace Professionals*, the Air National Guard could create a structure to grow its members in five major space disciplines. The disciplines could be Space Superiority, Strategic Spacelift, Global Information Services/ Utilities, Global Surveillance and Tracking, and Space Special Operations.<sup>133</sup>

For Clear AFS officers, a career path with set gates in his or her career would have the officer leave the home unit to perform Statutory Tours in other Missile Warning and Space Surveillance missions. This officer would then return to his or her home unit with the knowledge and experiences gained from other missions or positions. Career tracks within this space discipline would grow officers with in-depth knowledge in their mission set, and provide breadth of knowledge by providing career opportunities across a variety of components.<sup>134</sup>

A novel approach to this would start with the officer performing crew duties by operating the GBMW radar. After two to three years, the officer would move to one of the four staff offices of training, evaluation, mission support or weapons and tactics. Once the officer is a senior Captain through mid-grade Major, he or she would take one or two Statutory Tours outside of the GBMW mission set. The officer would then return and continue to progress

through other staffing positions in the radar. An officer on this notional career path, with experience in operations and staffing functions, would be prepared to take on future roles as the Director of Operations and eventually duties of a Commander.

With this career path, the ANG must receive more school authorization slots for newly hired Guardsmen. If school authorizations remain limited, Air Force Space Command and the National Guard Bureau should pursue a waiver process to allow newly hired space operators to train and certify at the home unit. A structure could be set up to have these new hires perform crew shifts with instructors or evaluators to ensure they are properly executing the mission. Then, when a school slot does come open, they can attend the course to receive full certification in the weapons system. It would eliminate front-end stagnation while a member waits for training.

Through the National Guard Bureau and Air Force Space Command, potential Statutory Tours could be created at: AFSPC Headquarters, the 21<sup>st</sup> SW, the UST or IQT schoolhouse, the Missile Warning Center, NORAD/NORTHCOM, the JSpOC, Space Liaison with Red Flag Alaska, and Executive Officer tours with any component of the Air Force.<sup>135</sup> In addition, an officer exchange tour could be set up with the Alaska Army National Guard's 49<sup>th</sup> Missile Defense Battalion, giving breadth in the MDA mission, and joint operations tour credit. This could solve career stagnation amongst Guard officers at Clear AFS, and would build well-rounded leaders for tomorrow.

### **Assign One Dual Status Commander at Clear Air Force Station**

This paper provides one final recommendation to preserve unity of command by assigning one Dual Status Commander in charge of Clear AFS; a Dual Status Deputy

Commander position is required as well. These commanders should be opposite service of each other; if the Commander is Active Duty Air Force, the Deputy should be Air National Guard; then roles should switch, and an Air National Guardsmen should be the Commander, with an Active Duty Air Force Deputy. A Dual Status Commander and Deputy Commander would have authority over “all”, both Guard and Active Duty Air Force, members assigned in a Classic Associate unit.

A Dual Status Commander (DSC) is an Army National Guard, Air National Guard, Active Duty Army, or Active Duty Air Force officer who may serve in both Federal and State status simultaneously.<sup>136</sup> USC Title 32, § 315, *Detail of regular members of Army and Air Force to duty with National Guard*, and § 325, *Relief from National Guard duty when ordered to active duty* authorize this dual status.<sup>137</sup> These commanders must complete specialized training and receive certification before assuming a DSC position.<sup>138</sup> Once appointed, Commander of USNORTHCOM and the Chief of the National Guard Bureau jointly manage the DSC position.<sup>139</sup> Both the President of the United States and the Governor of the State must agree to the establishment of a DSC.<sup>140</sup>

The Commander and Deputy Commander position should alternate between Air Force and Air National Guard as well. The MOA between the Air Force Space Command, the State of Alaska, and the National Guard Bureau stated an intent to alternate command between Active Duty Air Force and Air National Guard on a 24-month basis.<sup>141</sup> In addition, the creation of a Deputy Commander position, and having that member be of opposite service of the sitting commander, would provide the needed knowledge and background in his or her respective service and specific chain of command. It also allows for unity of command to stay intact if one commander takes leave, or is on temporary duty away from the home station.

Unity of Command is essential to ensure efficient and effective employment of assigned forces.<sup>142</sup> A Dual Status Commander, with authority over all members in a Classic Associate unit, is able to provide one vision and mission for the forces assigned. It eases reporting of mission events and prevents dilution of the concept of “one base and one boss.”





## CONCLUSION

On 14 April 2016, Air Force Space Command and the Alaska Air National Guard will celebrate a decade of performing the Ground Based Missile Warning and Space Surveillance mission as a Total Force Integrated, Classic Associate unit structure. The 13<sup>th</sup> and 213<sup>th</sup> SWS at Clear AFS Alaska is unique as it is the only TFI, Classic Associate, Air Force and Air National Guard unit in the GBMW architecture. After 10 years of operation, a Case Study on this unit has found benefits, drawbacks, and challenges in this unit structure.

A case study of this unique unit provided background on AFSPC and how the 13<sup>th</sup> and 213<sup>th</sup> SWS's mission fits in it. Criticality of the Missile Warning mission and its strategic implications in accurate Missile Warning reporting means these space operators must be precise in this "no fail" mission. The Contested, Degraded, and Operationally Limited space environment and space crew transition to a Space Force Mission construct, will rely on experienced space operators, such as Guardsmen, to provide in-depth "subject-matter expertise" in advanced training and navigation of the CDO space environment.

The Case Study provided a brief history of Clear AFS and the evolution of the Classic Associate construct should other states, AFSPC, or the National Guard Bureau pursue other GBMW Classic Associate space unit structures. In addition, the paper examined the current structure between the 13<sup>th</sup> and 213<sup>th</sup> SWS, how Title 32 and Title 10 status affect reporting, operation, and protection of the GBMW radar. Finally, this section examined the Memorandum of Agreement, and how this governed employment of 213<sup>th</sup> SWS Guardsmen, and self-execution to Title 10 status to operate and protect the radar. .

Analysis of the Classic Associate structure sought to answer the question of what are the benefits, drawbacks, and challenges of operating in this Classic Associate structure. The

overarching benefit is the extensive knowledge, experience level, and continuity of operations the Guardsmen bring the mission set. With over five years of average experience in the GBMW mission, Guard space experience levels provide knowledge levels the new SMF construct seeks to obtain from all space operators. In addition, the Active Duty outside experience brought to the site by Air Force members on a one-year remote tour provide the Guardsman with knowledge, diversity and experiences from other space mission sets. The combination of Guard in-depth knowledge and the diverse operational experiences from the Active Duty space operators provide a robust crew force ready to operate in the CDO space environment.

Analysis found three drawbacks and one challenge to the Classic Associate construct. The first drawback is Guardsmen use of Military Personnel Appropriation days each time they assume shift to operate or protect the radar. Second, The Air National Guard does not receive enough school authorizations for newly hired space operators, causing a significant delay in certifying these members to operate the weapons system. The third drawback is career stagnation and the lack of a structured career path for Guard space officers. The lack of a clear career path does not provide opportunity to build depth and breadth in the Missile Warning and Space Surveillance mission set, or build well-rounded leaders for the future. The challenge found in this Classic Associate construct is having two commanders at one installation. It creates the potential for dilution of unity of command, no one commander has authority over all of the military personnel assigned to the station.

The benefits that experienced Air National Guard space operators working alongside Active Duty Airmen brings to the Commanders of NORAD/NORTHCOM and the JSPOC far outweigh any drawbacks or challenges discovered in this research. With that, this research offered four recommendations to enhance this construct for future use at other units. Making all

Continental United States GBMW sites Classic Associate units would provide an experienced cadre of Air National Guard GBMW space operators ready to train their Active Duty counterparts, and provide continuity and expertise needed in the new SMF construct and CDO space environment. Changing GBMW to a “Homeland Defense” mission would alleviate the need for MPA days, and allow Guardsmen to perform the mission in a Title 32 Status. Creating a structured Air National Guard Missile Warning and Space Surveillance career path will eliminate career stagnation in the officer corps, and will create officers with depth and breadth in the GBMW mission set who are ready for more leadership roles. Finally, assigning a Dual Status Commander and Deputy Commander to the Classic Associate unit construct preserves unity of command by giving both these commanders authority over “all” personnel assigned to the unit.

The men and women of Clear AFS play a critical role in the defense of the United States. The Classic Associate unit model provides the most seasoned, deftly experienced and knowledgeable GBMW Active Duty and Air National Guard crew force, ready to handle the new CDO space environment, and prepared to execute Missile Warning events. It is in the best interest of the AFSPC, NORAD/NORTHCOM, and JSpOC Commanders to employ a Classic Associate model at all Continental United States Ground Based Missile Warning and Space Surveillance radars to provide the strengths of a TFI construct in the continued protection of the United States.

## **NOTES**

<sup>1</sup> United States Air Force Fact Sheet, Air Force Space Command, <http://www.afspc.af.mil/library/factsheets/index.asp>, (accessed 20 December 2015).

<sup>2</sup> “The Book”, *Airman Magazine*, Vol. LV, Number 3, (2011), 11.

<sup>3</sup> United States Air Force Fact Sheet, Air Force Space Command.

<sup>4</sup> United States Air Force, Air Force Space Command, <http://www.afspc.af.mil/main/welcome.asp>, (accessed 15 December 2015).

<sup>5</sup> United States Air Force Fact Sheet, Air Force Space Command.

<sup>6</sup> Peterson Air Force Base, 21st Space Wing, <http://www.peterson.af.mil/units/index.asp>, (accessed 15 December 2015).

<sup>7</sup> United States Air Force, Air Force Space Command.

<sup>8</sup> Ibid.

<sup>9</sup> Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, [http://www.acq.osd.mil/ncbdp/nm/nm\\_book\\_5\\_11/chapter\\_4.htm](http://www.acq.osd.mil/ncbdp/nm/nm_book_5_11/chapter_4.htm), (accessed 20 December 2015).

<sup>10</sup> NORAD and USNORTHCOM Headquarters Sight Picture, 2013, <http://www.northcom.mil/Portals/28/Documents/Supporting%20documents/Newcomers/NORAD%20and%20USNORTHCOM%20Headquarters%20Sight%20Picture%20Mar%202013.pdf> (accessed 16 December 2015).

<sup>11</sup> United States Air Force Fact Sheet, Joint Functional Component Command for Space, <http://www.vandenberg.af.mil/library/factsheets/factsheet.asp?id=12579>, (December 2012).

<sup>12</sup> Ibid.

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.

<sup>15</sup> United States Air Force Fact Sheet, Joint Functional Component Command for Space, <http://www.vandenberg.af.mil/library/factsheets/factsheet.asp?id=4684>, (accessed 15 December 2015).

<sup>16</sup> Peterson Air Force Base, 21st Space Wing.

<sup>17</sup> Robbert, Albert A., et al. “Suitability of Missions for the Air Force Reserve Components”, RAND CORPORATION, (2014), 73.

<sup>18</sup> CMSgt Chad Parsons, “213<sup>th</sup> Space Warning Squadron”, *Warriors Magazine*, Alaska Department of Veterans Affairs, Office of Public Affairs, (Camp Denali, Ft. Richardson Alaska, Spring 2014), 20.

<sup>19</sup> Ibid.

<sup>20</sup> NORAD and USNORTHCOM Headquarters Sight Picture.

<sup>21</sup> Ibid.

<sup>22</sup> U.S. Department of Defense Missile Defense Agency, “Elements, Ground-Based Midcourse Defense”, (22 September 2015), <http://www.mda.mil/system/gmd.html>.

<sup>23</sup> Defense Science Board, *Science and Technology Issues of Early Intercept Ballistic Missile Defense Feasibility*, (The Pentagon, OUSD, September 2011), 29.  
<http://www.acq.osd.mil/dsb/reports/ADA552472.pdf>.

<sup>24</sup> Ibid., 7.

<sup>25</sup> United States Department of Defense. *Quadrennial Defense Review Report*. (Washington, D.C.: Government Printing Office, February 2014), X.

<sup>26</sup> Gen John E. Hyten, Commander Air Force Space Command, “Space Mission Force Letter.” (2015) <https://eis.afspc.af.mil/Pages/Default.aspx>.

<sup>27</sup> United States Air Force Fact Sheet, Joint Functional Component Command for Space.

<sup>28</sup> Ibid.

<sup>29</sup> Dr. Kelso, T.S, “Iridium 33/Cosmos 2251 Collision”, CelesTrak.com (30 July 2012), <http://celestrak.com/events/collision/>.

<sup>30</sup> Ibid.

<sup>31</sup> Bergin, Chris, “Debris from old Russian satellite forced ISS crew into contingency ops”, *NASA Spaceflight.com*, (16 July 2015), <http://www.nasaspaceflight.com/2015/07/debris-russian-satellite-iss-crew-contingency-ops/>.

<sup>32</sup> Robey, Patricia A., “Defining the Space Professional.” *High Frontier, The Journal for Space and Cyberspace Professionals* Vol. 4, no. 1 (Nov 2007), 25.  
<http://www.afspc.af.mil/shared/media/document/AFD-110825-027.pdf>.

<sup>33</sup> Dr. Beason, Doug, et al., “Space”, *Global Horizons Final Report*, “The United States Global Science and Technology Vision,” (AF/ST TR 13-0, 21 Jun 2013), 12.

<sup>34</sup> Gen John E. Hyten, Commander Air Force Space Command, “Space Mission Force Letter.”

<sup>35</sup> Capt Bell, Bryan M. and 2d Lt Even T. Rogers, “Space Resilience and the Contested, Degraded, and Operationally Limited Environment.” *Air & Space Power Journal*, (November – December 2014), 144. [http://www.airpower.maxwell.af.mil/digital/pdf/articles/2014-Nov-Dec/SEW-Bell\\_Rogers.pdf](http://www.airpower.maxwell.af.mil/digital/pdf/articles/2014-Nov-Dec/SEW-Bell_Rogers.pdf).

<sup>36</sup> Tucker, Patrick, “USAF Stands up Space Mission Force to Counter Russian, China,” *Defense One*, (1 February 2016), <http://www.defenseone.com/technology/2016/02/usaf-stands-space-mission-force-counter-russia-china/125568/>.

<sup>37</sup> Gen John E. Hyten, Commander Air Force Space Command, “Space Mission Force Letter.”

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.

<sup>40</sup> Ibid.

<sup>41</sup> Tirpak, John A. “The Blended Wing goes to War”, *Air Force Magazine*, (October 2003), 31 <http://www.airforcemag.com/MagazineArchive/Documents/2003/October%202003/1003blend.pdf>.

<sup>42</sup> Lt Col Morand, Matthew, “Total Force, Mission Partner”, (5 June 2013), <http://www.peterson.af.mil/news/story.asp?id=123351264>.

<sup>43</sup> Capps, Kris, “Clear Air Force Station Turns 50”, *Fairbanks Daily News-Miner*, (8 August 2011), 1. [http://www.newsminer.com/clear-air-force-station-turns/article\\_724dd91e-bb2d-5092-9b71-9bdc4fd3bdce.html](http://www.newsminer.com/clear-air-force-station-turns/article_724dd91e-bb2d-5092-9b71-9bdc4fd3bdce.html).

<sup>44</sup> Matthews, William, “Ultimate High ground”, *National Guard Magazine*, (August 2014), 6. <http://nationalguardmagazine.com/article/Ultime+High+Ground/1786266/221397/article.html>.

<sup>45</sup> United States Air Force Fact Sheet, 13<sup>th</sup> Space Warning Squadron, [http://www.peterson.af.mil/library/factsheets/factsheet\\_print.asp?fsID=4714&page=1](http://www.peterson.af.mil/library/factsheets/factsheet_print.asp?fsID=4714&page=1).

<sup>46</sup> Ibid.

<sup>47</sup> Capps, Kris, “Clear Air Force Station Turns 50”, 1.

<sup>48</sup> United States Air Force Fact Sheet, 13<sup>th</sup> Space Warning Squadron, [http://www.peterson.af.mil/library/factsheets/factsheet\\_print.asp?fsID=4714&page=1](http://www.peterson.af.mil/library/factsheets/factsheet_print.asp?fsID=4714&page=1).

<sup>49</sup> Capps, Kris, “Clear Air Force Station Turns 50”, 1.

<sup>50</sup> United States Air Force Fact Sheet, 13<sup>th</sup> Space Warning Squadron.

<sup>51</sup> Ibid.

<sup>52</sup> Clear AFS Image, Google, [https://www.google.com/search?q=Clear+Air+force+station&biw=1366&bih=615&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjbwqTZlfbKAhVL4mMKHfIRDfwQ\\_AUICSgE](https://www.google.com/search?q=Clear+Air+force+station&biw=1366&bih=615&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjbwqTZlfbKAhVL4mMKHfIRDfwQ_AUICSgE) (accessed 3 February 2016).

<sup>53</sup> United States Air Force Fact Sheet, 13<sup>th</sup> Space Warning Squadron.

<sup>54</sup> Ibid.

<sup>55</sup> Matthews, William, “Ultimate High ground”, 7.

<sup>56</sup> Lt Gen Craig E. Campbell, AKANG, retired, State of Alaska Adjutant General, interview by author, 18 December 2015.

<sup>57</sup> Ibid.

<sup>58</sup> Certificate of Allotment, Department of the Army and Air Force National Guard Bureau, *Letter of Allotment: DAF/AIM 696S*, 28 April 2006.

<sup>59</sup> Robbert, Albert A., et al. “Suitability of Missions for the Air Force Reserve Components”, 72.

<sup>60</sup> Lt Gen Craig E. Campbell, interview.

<sup>61</sup> Ibid.

<sup>62</sup> Col Torrance L. Saxe, AKANG, Acting 168th AW Commander, interview by author, 18 August 2015.

<sup>63</sup> Lt Gen Craig E. Campbell, interview.

<sup>64</sup> Ibid.

<sup>65</sup> 49<sup>th</sup> Missile Defense Battalion (GMD), <http://www.globalsecurity.org/space/agency/49md.htm> (accessed 6 February 2016).

<sup>66</sup> Committee on Armed Services of the House of Representative, *Title 10 United States Code, Armed Forces*, Vol I., (United States Government Printing Office, Washington, 7 January 2011), 15.

<sup>67</sup> Ibid., 18.

<sup>68</sup> Department of Defense Instruction 1315.18. *Procedures for Military Personnel Assignments* (Washington, DC: Office of the Department of Defense, 28 October 2015), 55.

<sup>69</sup> Title 32-National Guard (United States GPO, Washington, DC, 26 April 2012), 27.  
<https://www.gpo.gov/fdsys/pkg/USCODE-2011-title32/pdf/USCODE-2011-title32.pdf>.

<sup>70</sup> Committee on Armed Services of the House of Representative, *Title 10 United States Code, Armed Forces*, Vol I., 15.

<sup>71</sup> Committee on Armed Services of the House of Representative, *Title 10 United States Code, Armed Forces*, Vol III., (United States Government Printing Office, Washington, 7 January 2011), 2291.

<sup>72</sup> Ibid., 2285.

<sup>73</sup> The State of Alaska. To Headquarters Air Force Space Command and the National Guard Bureau. Memorandums of Agreement Governing the Employment of the 213th Space Warning Squadron Clear AFS, (15 August 2013), 1.

<sup>74</sup> Air Force Instruction (AFI) 90-1001. *Responsibilities for Total Force Integration*, (15 January 2015), 11.

<sup>75</sup> Ibid.

<sup>76</sup> Memorandums of Agreement Governing the Employment of the 213th Space Warning Squadron Clear AFS, 1.

<sup>77</sup> Ibid., 1.

<sup>78</sup> Ibid., 2.

<sup>79</sup> Ibid.

<sup>80</sup> Ibid.

<sup>81</sup> Ibid.

<sup>82</sup> Ibid., 3.

<sup>83</sup> Ibid.

<sup>84</sup> Air Force Space Command Form 91, *Individual's Record of Duties and Qualification*, Clear AFS, 15 December 2015.

<sup>85</sup> Capt Eric L. Vantrease, AKANG, 213<sup>th</sup> Space Warning Squadron Chief of Standardization and Evaluation, interview by author, 25 February 2016.

<sup>86</sup> Air Force Space Command Form 91, *Individual's Record of Duties and Qualification*, Clear AFS, 15 December 2015.



<sup>87</sup> SMSgt Jamie S. Kurzenberger, AKANG, 213<sup>th</sup> Space Warning Squadron Superintendent, interview by author, 16 February 2016.

<sup>88</sup> Air Force Space Command Form 91, *Individual's Record of Duties and Qualification*, Clear AFS, 15 December 2015.

<sup>89</sup> Air Force Space Command Form 91, *Individual's Record of Duties and Qualification*, Clear AFS, 15 December 2015.

<sup>90</sup> Air Force Space Command Form 91, *Individual's Record of Duties and Qualification*, Clear AFS, 15 December 2015.

<sup>91</sup> Capt Eric L. Vantrease, interview.

<sup>92</sup> Ibid.

<sup>93</sup> Lt Col Keith M. Grimes, AKANG, 213<sup>th</sup> Space Warning Squadron Director of Operations, interview by author, 13 February 2016.

<sup>94</sup> Ibid.

<sup>95</sup> Ibid.

<sup>96</sup> Ibid.

<sup>97</sup> Ibid.

<sup>98</sup> Roosevelt, Thomas R., *Beyond Race and Gender, Unleashing the Power of Your Total Work Force by Managing Diversity* (New York, NY : AMACOM, 1991), 148.

<sup>99</sup> Dr. Beason, Doug, et al., "Space", *Global Horizons Final Report*, "The United States Global Science and Technology Vision," (AF/ST TR 13-0, 21 Jun 2013), 12.

<sup>100</sup> Iannotta, Becky and Mark Tariq, "U.S. Satellite Destroyed in Space Collision", *Space.com*, (11 February 2009), <http://www.space.com/5542-satellite-destroyed-space-collision.html>.

<sup>101</sup> Ibid.

<sup>102</sup> Gen John E. Hyten, Commander Air Force Space Command, "Space Mission Force Letter."

<sup>103</sup> Robbert, Albert A., et al. "Suitability of Missions for the Air Force Reserve Components", RAND CORPORATION, (2014), 73.

<sup>104</sup> Air Force Instruction (AFI) 90-1001. *Responsibilities for Total Force Integration*, 65.

<sup>105</sup> Ibid., 65.

<sup>106</sup> Ibid., 25.

<sup>107</sup> Ibid.

<sup>108</sup> Ibid.

<sup>109</sup> Ibid., 46.

<sup>110</sup> Air Force Space Command, *213 SWS MPA Utilization slide*, A2/A36, Director of Manpower and Personnel, 25 February 2016.

<sup>111</sup> SMSgt Jamie S. Kurzenberger, interview.

<sup>112</sup> Air Force Instruction (AFI) 36-3701. *Space Professional Development Program*, (20 May 2010), 11.

<sup>113</sup> Department of the Air Force, Space Systems Operations Career Field Enlisted Training Plan (CFETP 1C6X1), (4 April 2012), 7.

<sup>114</sup> Ibid.

<sup>115</sup> SMSgt Jamie S. Kurzenberger, interview.

<sup>116</sup> SMSgt Jeffery Knight, National Guard Bureau Space Functional Manager (A3/CS), interview by author, 17 February 2016.

<sup>117</sup> SMSgt Jamie S. Kurzenberger, interview.

<sup>118</sup> Air Force Instruction (AFI) 36-2611. *Officer Professional Development*, (1 April 1996), 5.

<sup>119</sup> Air National Guard Statutory Tour Vacancies, *Air National Guard*, <http://www.ang.af.mil/careers/mva/index.asp>, (accessed 10 February 2016).

<sup>120</sup> Col Torrance L. Saxe, interview.

<sup>121</sup> Ibid.

<sup>122</sup> Ibid.

<sup>123</sup> AFDD 1. *Air Force Basic Doctrine*, (27 February 2015), 30.

<sup>124</sup> Ibid.

<sup>125</sup> Ibid.

<sup>126</sup> Committee on Armed Services of the House of Representative, *Title 10 United States Code, Armed Forces*, Vol III., 2291.

<sup>127</sup> Homeland Security and Homeland Defense, <http://www.defense.gov/About-DoD/DoD-101#Homeland%20Security%20and%20Homeland%20Defense> (accessed 10 February 2016).

<sup>128</sup> “PAVE PAWS Radar Upgrades: Clear AFS Goes from Warning to BMD Targeting”, *Defense Industry Daily*, (17 September 2012), <http://www.defenseindustrydaily.com/bmews-radar-upgrades-clear-afs-goes-from-warning-to-bmd-targeting-07532/>.

<sup>129</sup> 49th Missile Defense Battalion (GMD), <http://www.globalsecurity.org/space/agency/49md.htm> (accessed 6 February 2016).

<sup>130</sup> Defense Science Board, *Science and Technology Issues of Early Intercept Ballistic Missile Defense Feasibility*, (The Pentagon, OUSD, September 2011), 8.

<sup>131</sup> Title 32-National Guard (United States GPO, Washington, DC, 26 April 2012), 51. <https://www.gpo.gov/fdsys/pkg/USCODE-2011-title32/pdf/USCODE-2011-title32.pdf>.

<sup>132</sup> Ibid.

<sup>133</sup> Col McLaughlin, Kevin J. and Col Chris D. Crawford, “Forward to the Future: A Roadmap for Air Force Space.” *High Frontier, The Journal for Space and Cyberspace Professionals* Vol. 4, no. 1 (Nov 2007), 31. <http://www.afspc.af.mil/shared/media/document/AFD-110825-027.pdf> (accessed 10 August 2015).

<sup>134</sup> Ibid.

<sup>135</sup> Col Torrance L. Saxe, AKANG, interview.

<sup>136</sup> Dual Status Commander, National Guard Fact Sheet, (October 2014), [http://www.nationalguard.mil/Portals/31/Features/Resources/Fact%20Sheets/new/Domestic\\_mission/dual\\_status.pdf](http://www.nationalguard.mil/Portals/31/Features/Resources/Fact%20Sheets/new/Domestic_mission/dual_status.pdf).

<sup>137</sup> Title 32-National Guard (United States GPO, Washington, DC, 26 April 2012), 25. <https://www.gpo.gov/fdsys/pkg/USCODE-2011-title32/pdf/USCODE-2011-title32.pdf>.

<sup>138</sup> Ibid.

<sup>139</sup> Ibid.

<sup>140</sup> Ibid.

<sup>141</sup> The State of Alaska. To Headquarters Air Force Space Command and the National Guard Bureau. Memorandums of Agreement Governing the Employment of the 213th Space Warning Squadron Clear AFS, (15 August 2013) 2.

<sup>142</sup> AFDD 1. *Air Force Basic Doctrine*, (27 February 2015), 30.



## **BIBLIOGRAPHY**

49<sup>th</sup> Missile Defense Battalion (GMD), <http://www.globalsecurity.org/space/agency/49md.htm> (accessed 6 February 2016).

AFDD 1. *Air Force Basic Doctrine*, 27 February 2015.

Air Force Instruction (AFI) 36-2611. *Officer Professional Development*, 1 April 1996.

Air Force Instruction (AFI) 36-3701. *The Space Professional Development Program*, 20 May 2010.

Air Force Instruction (AFI) 90-1001. *Responsibilities for Total Force Integration*, 15 January 2015.

Air National Guard Statutory Tour Vacancies, *Air National Guard*, <http://www.ang.af.mil/careers/mva/index.asp> (accessed 10 February 2016).

Air Force Space Command Form 91, *Individual's Record of Duties and Qualification*, Clear AFS, 15 December 2015.

Air Force Space Command, *213 SWS MPA Utilization slide*, A2/A36, Director of Manpower and Personnel, 25 February 2016.

Bergin, Chris, "Debris from old Russian satellite forced ISS crew into contingency ops", *NASA Spaceflight.com*, (16 July 2015), <http://www.nasaspaceflight.com/2015/07/debris-russian-satellite-iss-crew-contingency-ops/>.

Capps, Kris, "Clear Air Force Station Turns 50", *Fairbanks Daily News-Miner*, (8 August 2011) [http://www.newsminer.com/clear-air-force-station-turns/article\\_724dd91e-bb2d-5092-9b71-9bdc4fd3bdce.html](http://www.newsminer.com/clear-air-force-station-turns/article_724dd91e-bb2d-5092-9b71-9bdc4fd3bdce.html).

Capt Bell, Bryan M. and 2d Lt Even T. Rogers, "Space Resilience and the Contested, Degraded, and Operationally Limited Environment." *Air & Space Power Journal*, (November – December 2014), [http://www.airpower.maxwell.af.mil/digital/pdf/articles/2014-Nov-Dec/SEW-Bell\\_Rogers.pdf](http://www.airpower.maxwell.af.mil/digital/pdf/articles/2014-Nov-Dec/SEW-Bell_Rogers.pdf).

Capt Eric L. Vantrease, AKANG, 213<sup>th</sup> Space Warning Squadron Chief of Standardization and Evaluation, interview by author, 25 February 2016.

Certificate of Allotment, Department of the Army and Air Force National Guard Bureau, *Letter of Allotment: DAF/AIM 696S*, 28 April 2006.

Clear AFS Image, Google [https://www.google.com/search?q=Clear+Air+force+station&biw=1366&bih=615&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjbwqTZlfbKAhVL4mMKHfIRDfwQ\\_AUICSgE](https://www.google.com/search?q=Clear+Air+force+station&biw=1366&bih=615&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjbwqTZlfbKAhVL4mMKHfIRDfwQ_AUICSgE) (accessed 3 February 2016).

CMSgt Chad Parsons, “213th Space Warning Squadron”, Warriors Magazine, Alaska Department of Veterans Affairs, Office of Public Affairs, (Camp Denali, Ft. Richardson Alaska, Spring 2014).

Col McLaughlin, Kevin J. and Col Chris D. Crawford, “Forward to the Future: A Roadmap for Air Force Space.” High Frontier, The Journal for Space and Cyberspace Professionals Vol. 4, no. 1 (Nov 2007), <http://www.afspc.af.mil/shared/media/document/AFD-110825-027.pdf> (accessed 10 August 2015).

Col Torrance L. Saxe, AKANG, 168th AW Commander, interview by author, 18 August 2015.

Committee on Armed Services of the House of Representative, *Title 10 United States Code, Armed Forces*, Vol I., (United States Government Printing Office, Washington, 7 January 2011).

Committee on Armed Services of the House of Representative, *Title 10 United States Code, Armed Forces*, Vol III., (United States Government Printing Office, Washington, 7 January 2011).

Department of the Air Force, Space Systems Operations Career Field Enlisted Training Plan (CFETP 1C6X1), (4 April 2012).

Department of Defense Instruction 1315.18. *Procedures for Military Personnel Assignments* (Washington, DC: Office of the Department of Defense, 28 October 2015).

Defense Science Board, Science and Technology Issues of Early Intercept Ballistic Missile Defense Feasibility, (The Pentagon, OUSD, September 2011), <http://www.acq.osd.mil/dsb/reports/ADA552472.pdf>.

Dr. Beason, Doug, et al., “Space”, *Global Horizons Final Report*, “The United States Global Science and Technology Vision,” (AF/ST TR 13-0, 21 Jun 2013).

Dr. Kelso, T.S, “Iridium 33/Cosmos 2251 Collision”, CelesTrak.com (30 July 2012), <http://celestrak.com/events/collision/>.

Dual Status Commander, National Guard Fact Sheet, (October 2014), [http://www.nationalguard.mil/Portals/31/Features/Resources/Fact%20Sheets/new/Domestic\\_mission/dual\\_status.pdf](http://www.nationalguard.mil/Portals/31/Features/Resources/Fact%20Sheets/new/Domestic_mission/dual_status.pdf).

Gen John E. Hyten, Commander Air Force Space Command, “Space Mission Force Letter.” (2015) <https://eis.afspc.af.mil/Pages/Default.aspx>.

- Homeland Security and Homeland Defense, <http://www.defense.gov/About-DoD/DoD-101#Homeland%20Security%20and%20Homeland%20Defense> (accessed 10 February 2016).
- Iannotta, Becky and Mark Tariq, “U.S. Satellite Destroyed in Space Collision”, *Space.com*, (11 February 2009), <http://www.space.com/5542-satellite-destroyed-space-collision.html>.
- Lt Col Keith M. Grimes, AKANG, 213<sup>th</sup> Space Warning Squadron Director of Operations, interview by author, 13 February 2016.
- Lt Col Morand, Matthew, “Total Force, Mission Partner”, (5 June 2013), <http://www.peterson.af.mil/news/story.asp?id=123351264>.
- Lt Gen Craig E. Campbell, AKANG, retired, State of Alaska Adjutant General, interview by author, 18 December 2015.
- Matthews, William, “Ultimate High ground”, *National Guard Magazine*, (August 2014), 7. <http://nationalguardmagazine.com/article/Ultime+High+Ground/1786266/221397/article.html>.
- NORAD and USNORTHCOM Headquarters Sight Picture, 2013, <http://www.northcom.mil/Portals/28/Documents/Supporting%20documents/Newcomers/NORAD%20and%20USNORTHCOM%20Headquarters%20Sight%20Picture%20Mar%202013.pdf> (accessed 16 December 2015).
- Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, [http://www.acq.osd.mil/ncbdp/nm/nm\\_book\\_5\\_11/chapter\\_4.htm](http://www.acq.osd.mil/ncbdp/nm/nm_book_5_11/chapter_4.htm), (accessed 20 December 2015).
- “PAVE PAWS Radar Upgrades: Clear AFS Goes from Warning to BMD Targeting”, *Defense Industry Daily*, (17 September 2012), <http://www.defenseindustrydaily.com/bmews-radar-upgrades-clear-afs-goes-from-warning-to-bmd-targeting-07532/>.
- Peterson Air Force Base, 21<sup>st</sup> Space Wing, <http://www.peterson.af.mil/units/index.asp>, (accessed 15 December 2015).
- Robey, Patricia A. “Defining the Space Professional”, in *High Frontier, The Journal for Space and Missile Professionals*, Vol 4. No. 1 (Head Quarters Air Force Space Command, Peterson CO., 2007).
- Robbert, Albert A., et al. “Suitability of Missions for the Air Force Reserve Components”, RAND CORPORATION, (2014).
- Roosevelt, Thomas R., *Beyond Race and Gender, Unleashing the Power of Your Total Work Force by Managing Diversity* (New York, NY : AMACOM, 1991).

SMSgt Jeffery Knight, National Guard Bureau Space Functional Manager (A3/CS), interview by author, 17 February 2016.

SMSgt Jamie S. Kurzenberger, 213<sup>th</sup> Space Warning Squadron Superintendent, interview by author, 16 February 2016.

“The Book”, *Airman Magazine*, Vol. LV, Number 3, (2011).

The State of Alaska. To Headquarters Air Force Space Command and the National Guard Bureau. Memorandums of Agreement Governing the Employment of the 213th Space Warning Squadron Clear AFS, 15 August 2013.

Tirpak, John A. “The Blended Wing goes to War”, *Air Force Magazine*, (October 2003) <http://www.airforcemag.com/MagazineArchive/Documents/2003/October%202003/1003blend.pdf>.

Title 32-National Guard (United States GPO, Washington, DC, 26 April 2012) <https://www.gpo.gov/fdsys/pkg/USCODE-2011-title32/pdf/USCODE-2011-title32.pdf>.

Tucker, Patrick, “USAF Stands up Space Mission Force to Counter Russian, China,” *Defense One*, (1 February 2016), <http://www.defenseone.com/technology/2016/02/usaf-stands-space-mission-force-counter-russia-china/125568/>.

U.S. Department of Defense Missile Defense Agency, “Elements, Ground-Based Midcourse Defense”, (22 September 2015), <http://www.mda.mil/system/gmd.html>.

United States Department of Defense. Quadrennial Defense Review Report. (Washington, D.C.: Government Printing Office, February 2014).

United States Air Force, Air Force Space Command, <http://www.afspc.af.mil/main/welcome.asp>, (accessed 15 December 2015).

United States Air Force Fact Sheet, 13<sup>th</sup> Space Warning Squadron, [http://www.peterson.af.mil/library/factsheets/factsheet\\_print.asp?fsID=4714&page=1](http://www.peterson.af.mil/library/factsheets/factsheet_print.asp?fsID=4714&page=1).

United States Air Force Fact Sheet, Air Force Space Command, <http://www.afspc.af.mil/library/factsheets/index.asp>, (accessed 20 December 2015).

United States Air Force Fact Sheet, Joint Functional Component Command for Space, <http://www.vandenberg.af.mil/library/factsheets/factsheet.asp?id=12579>, (accessed 15 December 2015).

United States Air Force Fact Sheet, Joint Functional Component Command for Space, <http://www.vandenberg.af.mil/library/factsheets/factsheet.asp?id=4684>, (accessed 15 December 2015).